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Supporting Information

Chiral Transcription to Cationic Polycobaltocenes over Multiple Length Scales using Anionic Surfactants

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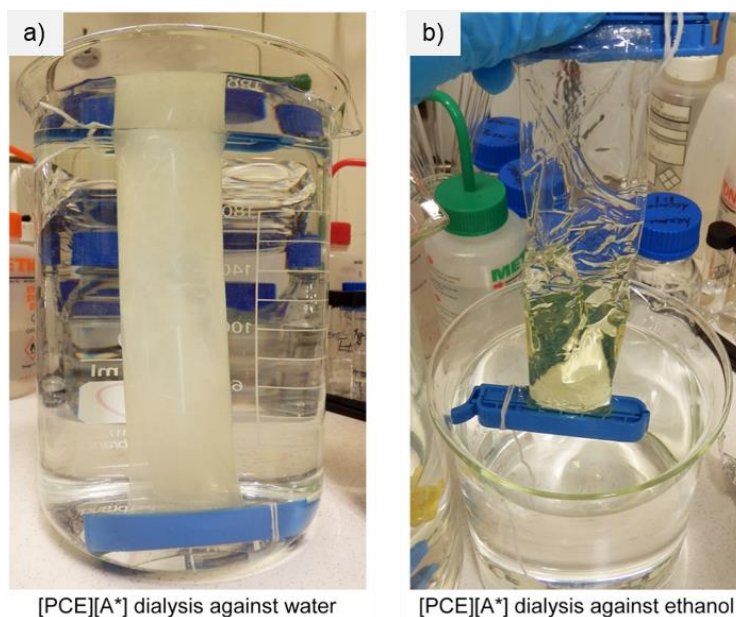


Figure S1. Representative photographs of the $[PCE][A^*]_n$ complexes during dialysis against water and ethanol: a) the $[PCE][A^*]_n$ complexes are insoluble in water and formed a precipitate during dialysis against water b) on further dialysis against ethanol, the precipitate gradually dissolves, and a clear yellow solution eventually formed.

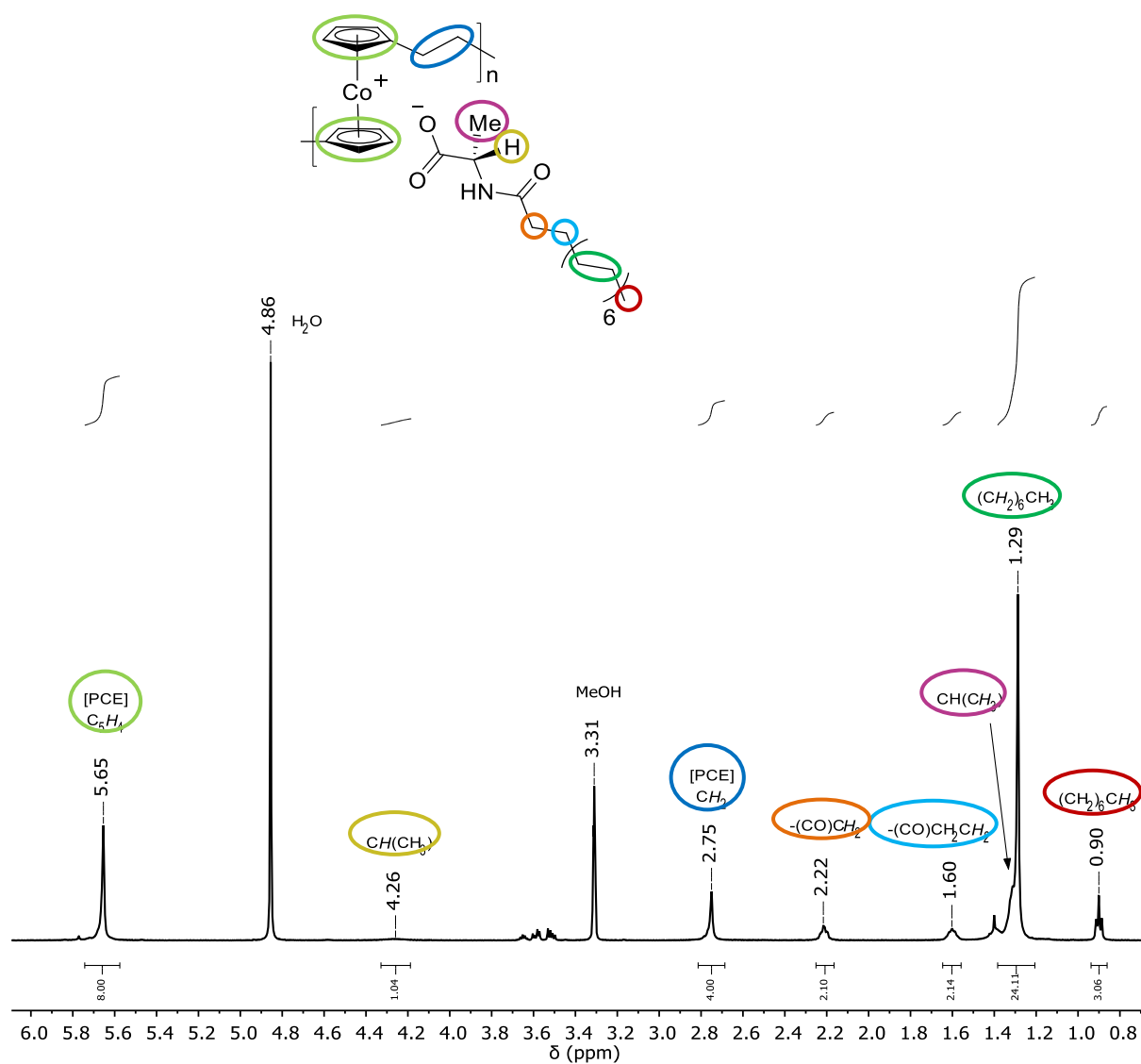


Figure S2. ¹H NMR (500 MHz, CD₃OD) spectrum of [PCE][C₁₆-L-Ala]_n complex.

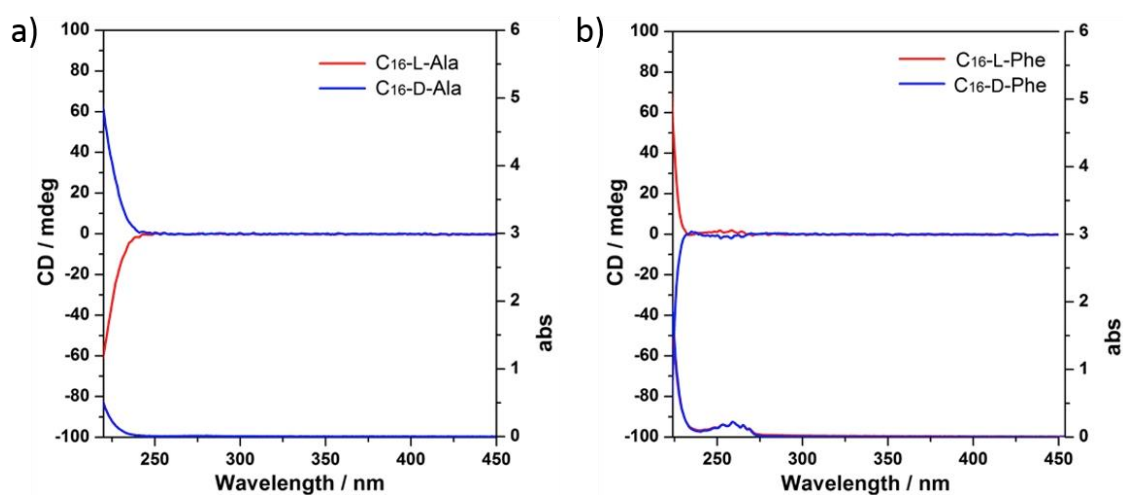


Figure S3. CD and UV-vis spectra of aqueous solutions of a) [Na][C₁₆-L-Ala] and [Na][C₁₆-D-Ala], and b) [Na][C₁₆-L-Phe] and [Na][C₁₆-D-Phe], all at 0.5 mg mL⁻¹ in EtOH.

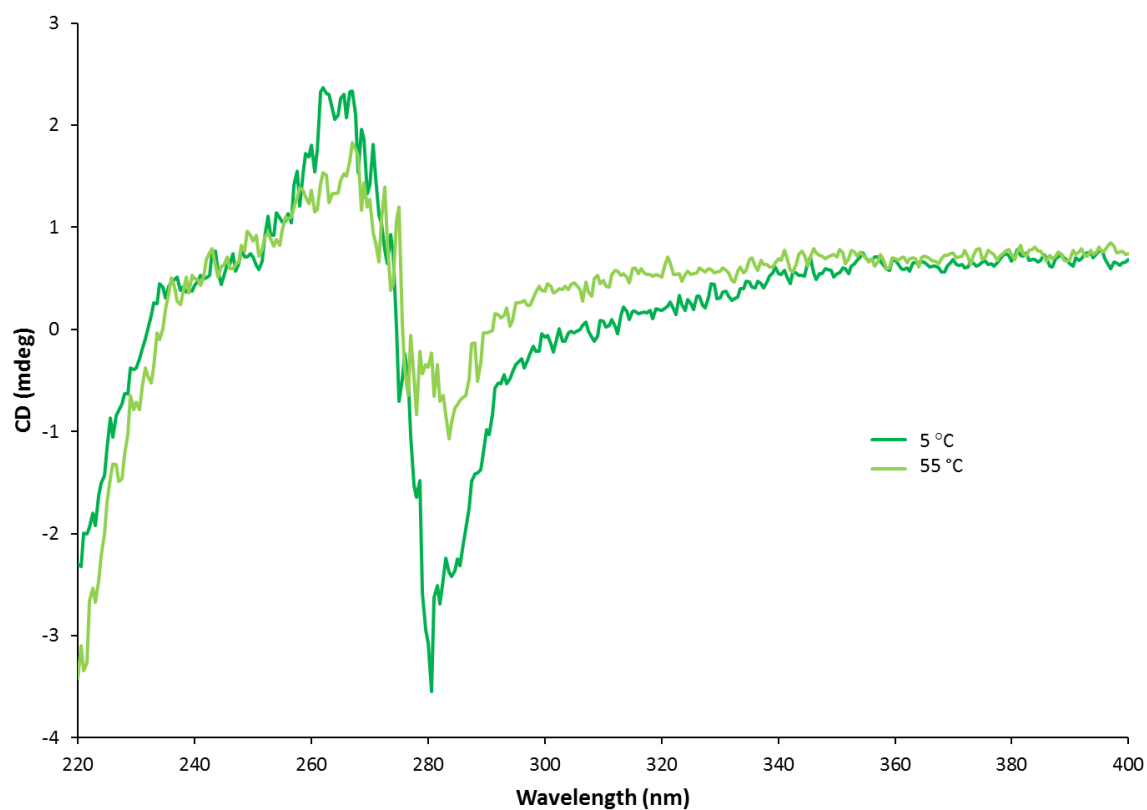


Figure S4. CD spectra of [PCE][C₁₆-L-Ala]_n at 0.5 mg mL⁻¹ in EtOH taken at 5 °C and 55 °C.

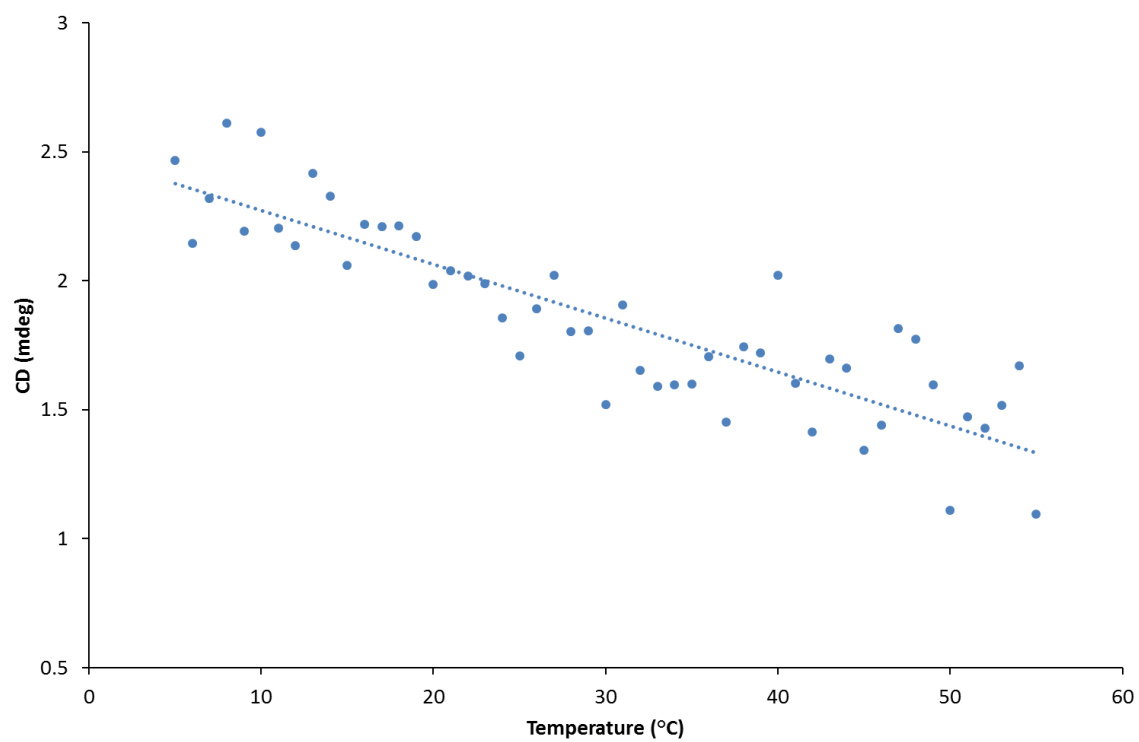


Figure S5. CD response of [PCE][C₁₆-L-Ala]_n at 0.5 mg mL⁻¹ in EtOH at 266 nm over a range of temperatures (5 °C to 55 °C).

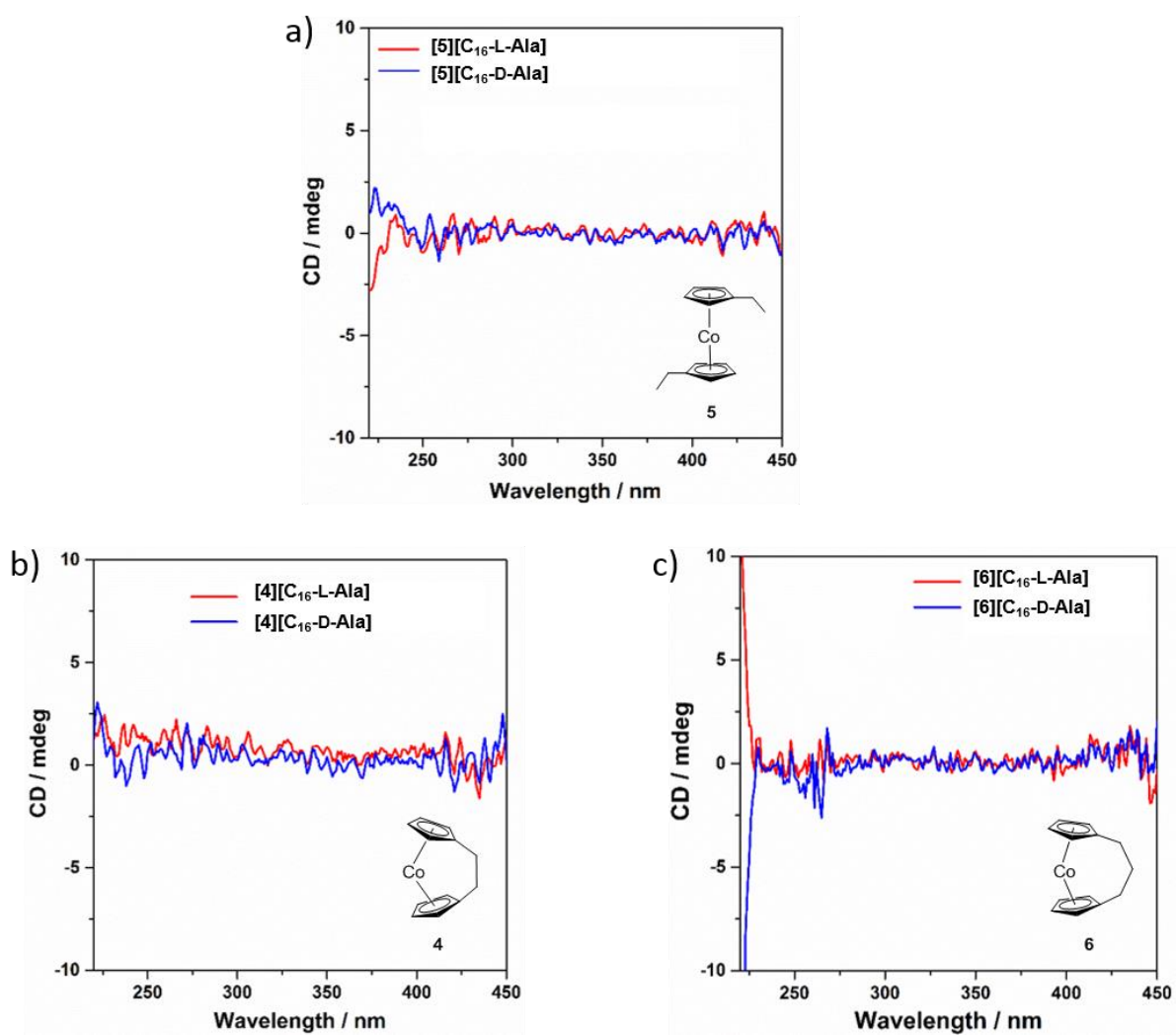


Figure S6. CD spectra of complexes formed by (a) bis(ethylcyclopentadienyl) cobalt(III), (b) dicarba[2]cobaltocenophanium and (c) tricarba[3]cobaltocenophanium with $[C_{16}\text{-L-Ala}]^-$ (red lines) and $[C_{16}\text{-D-Ala}]^-$ (blue line), all at 0.5 mg mL^{-1} in EtOH.

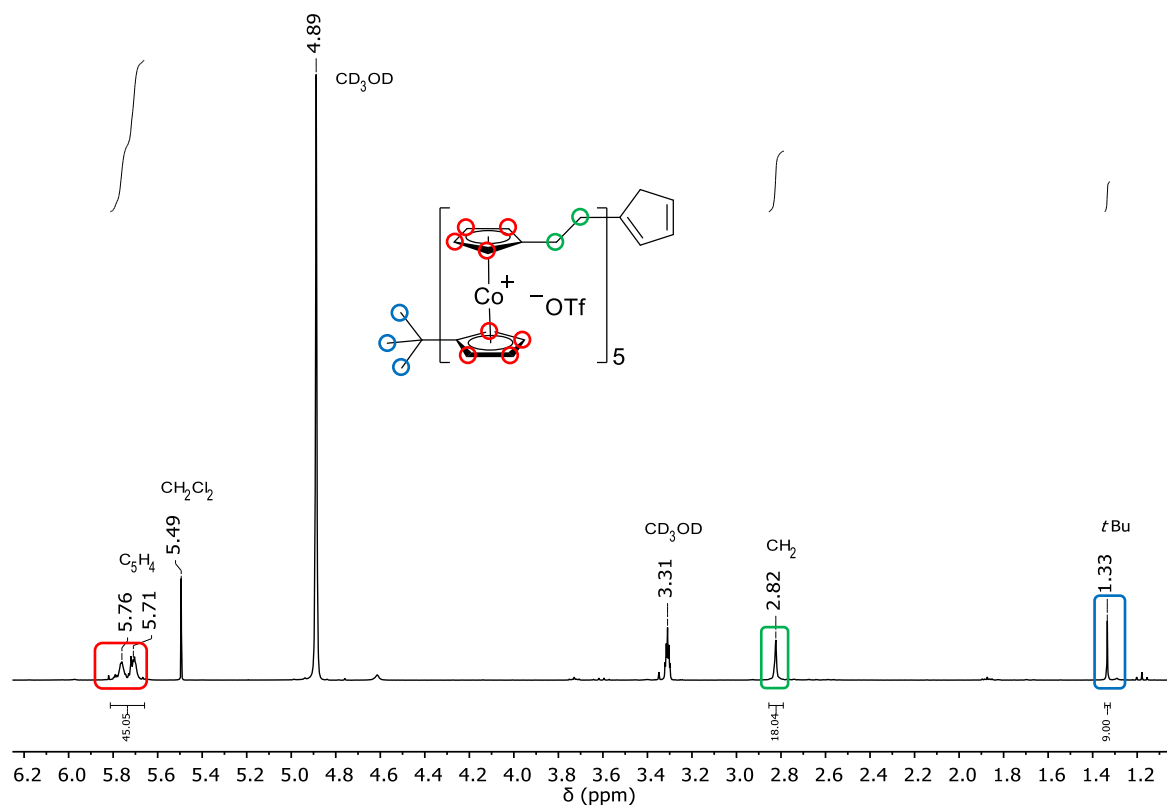


Figure S7. ^1H NMR (300 MHz, CD_3OD) spectrum of $[\text{OCE}_5][\text{OTf}]_5$ complex.

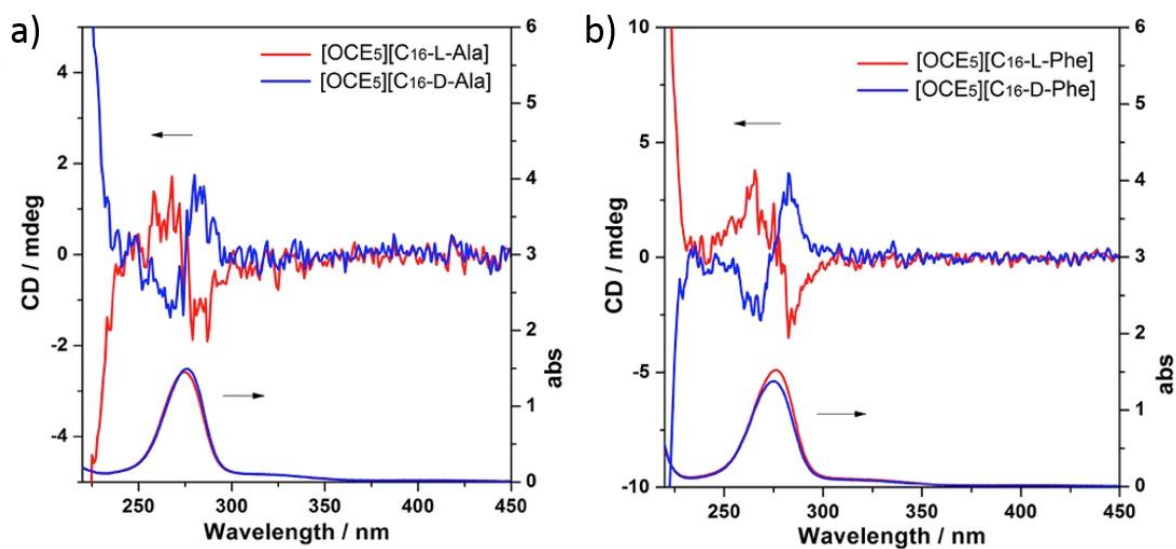


Figure S8. CD and UV-vis spectra of solutions of a) $[\text{OCE}_5][\text{C}_{16}\text{-L-Ala}]_5$ and $[\text{OCE}_5][\text{C}_{16}\text{-D-Ala}]_5$ complexes and b) $[\text{OCE}_5][\text{C}_{16}\text{-L-Phe}]_5$ and $[\text{OCE}_5][\text{C}_{16}\text{-D-Phe}]_5$ complexes, all at 0.5 mg mL^{-1} in EtOH.

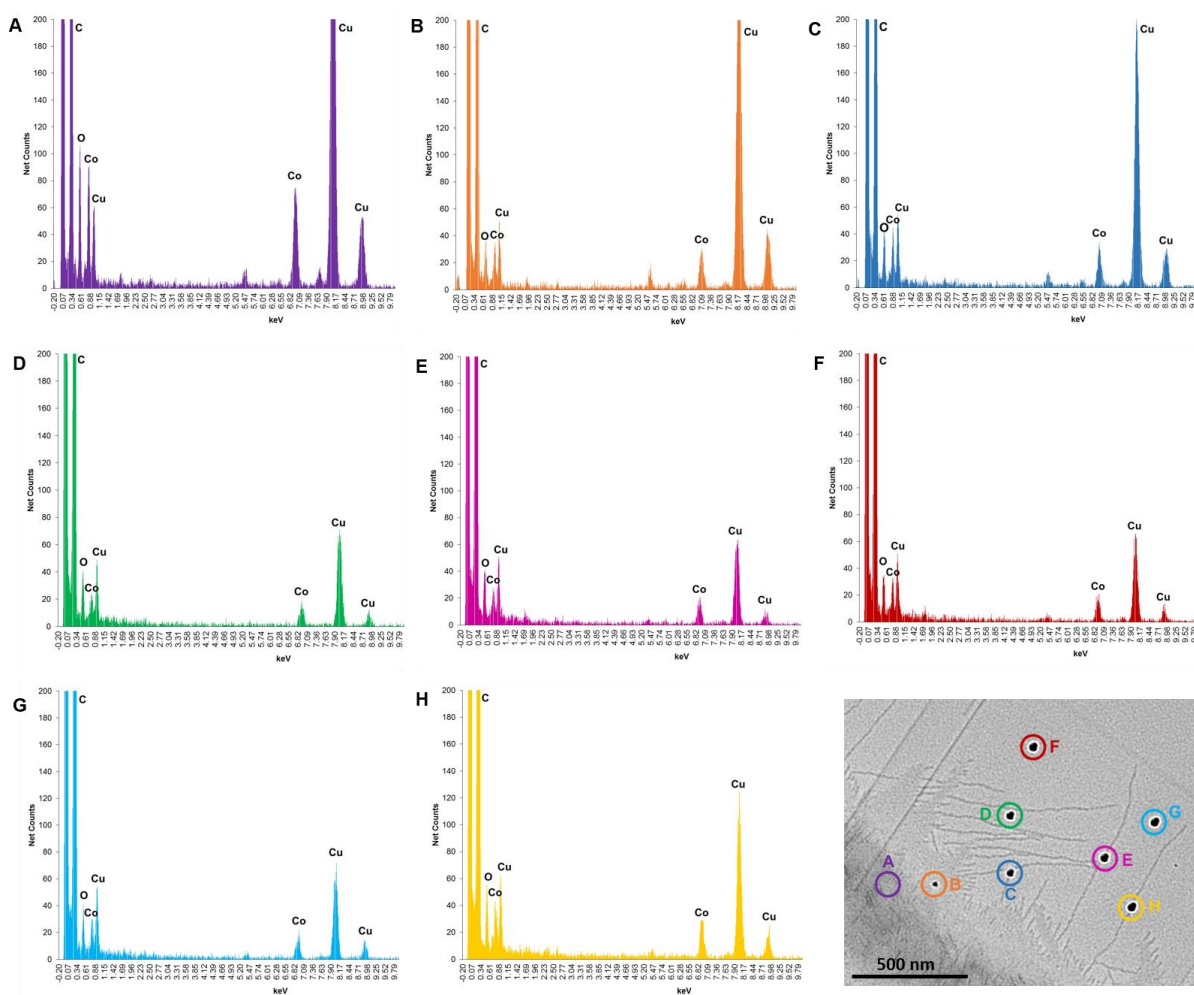


Figure S9. EDX analyses of spots A, B, C, D, E, F, G and H of [PCE][C₁₆-L-Ala]_n solution in ethanol, drop cast onto a carbon-coated copper TEM grid. The detection of Cu in all cases is due to the use of copper TEM grids.

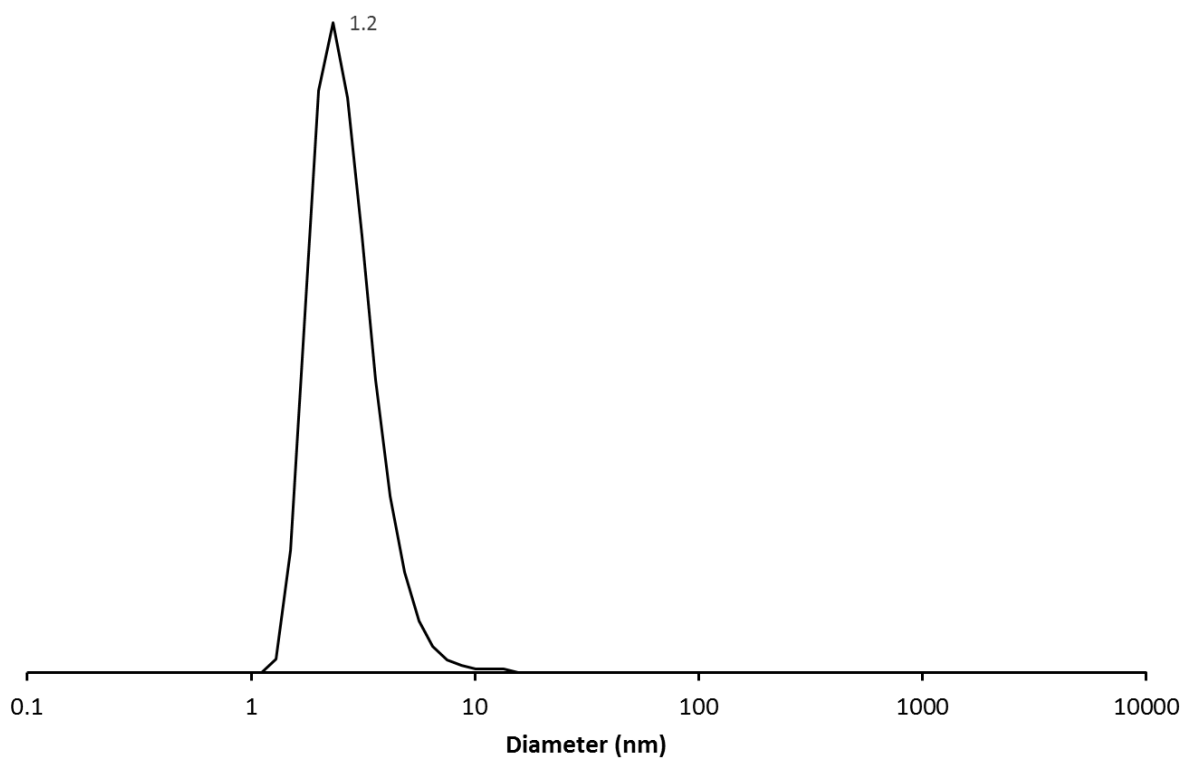


Figure S10. DLS size distribution by volume of [PCE][C₁₆-L-Ala]_n complex (EtOH, 25 °C, 12 mg mL⁻¹). R_h = 1.2 nm.

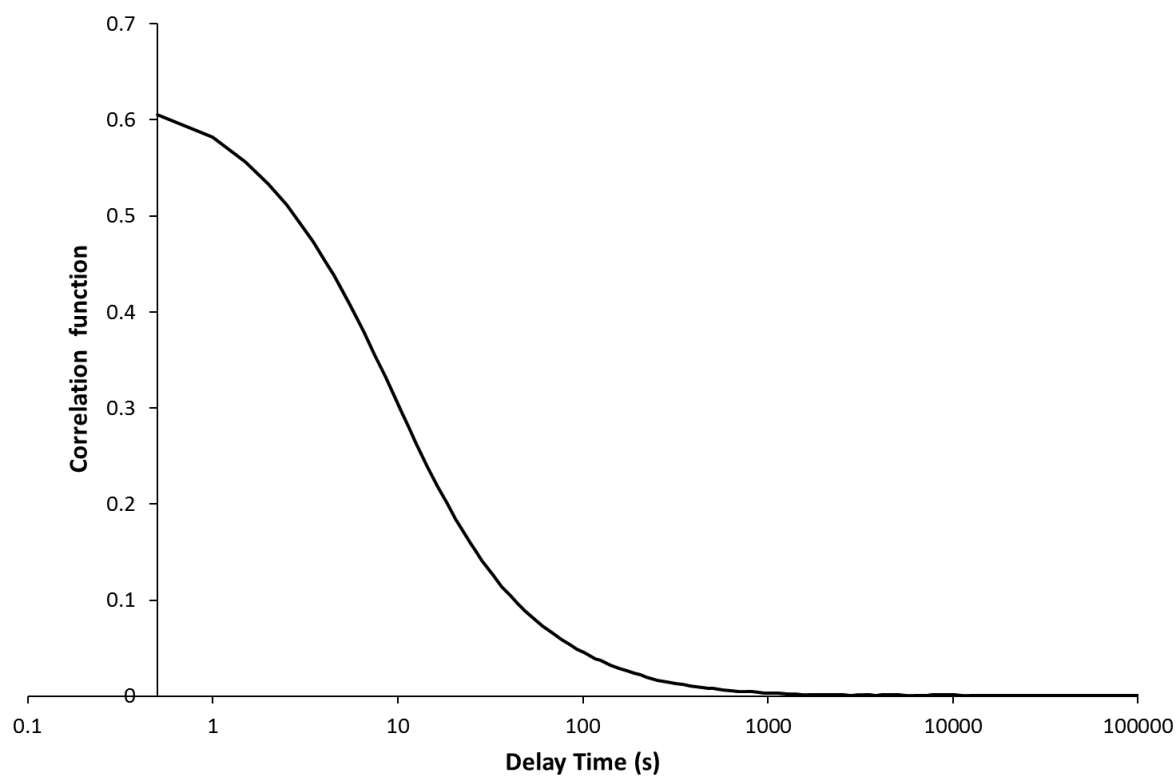


Figure S11. Raw DLS correlation data of [PCE][C₁₆-L-Ala]_n complex (EtOH, 25 °C, 12 mg mL⁻¹).

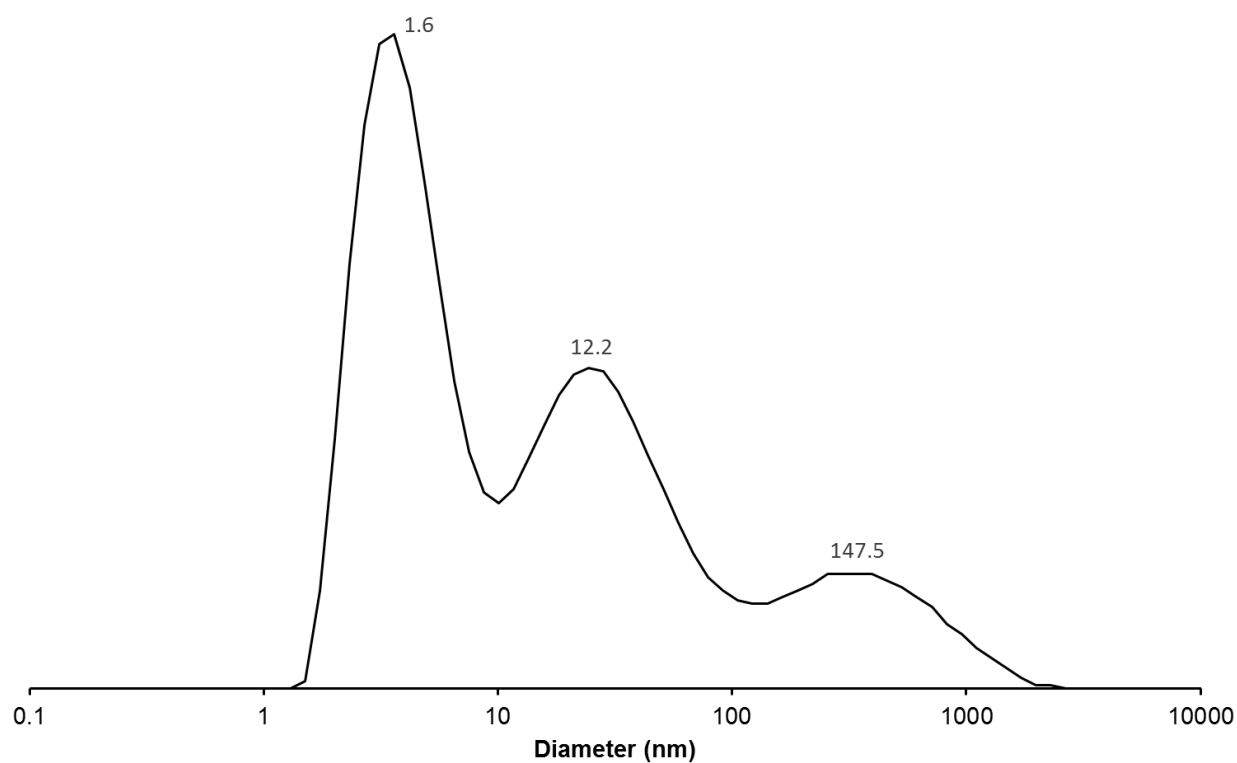


Figure S12. DLS size distribution by intensity of [PCE][C₁₆-L-Ala]_n complex (EtOH, 25 °C, 12 mg mL⁻¹). $R_h = 1.6$ nm, 12.2 nm, 147.5 nm.

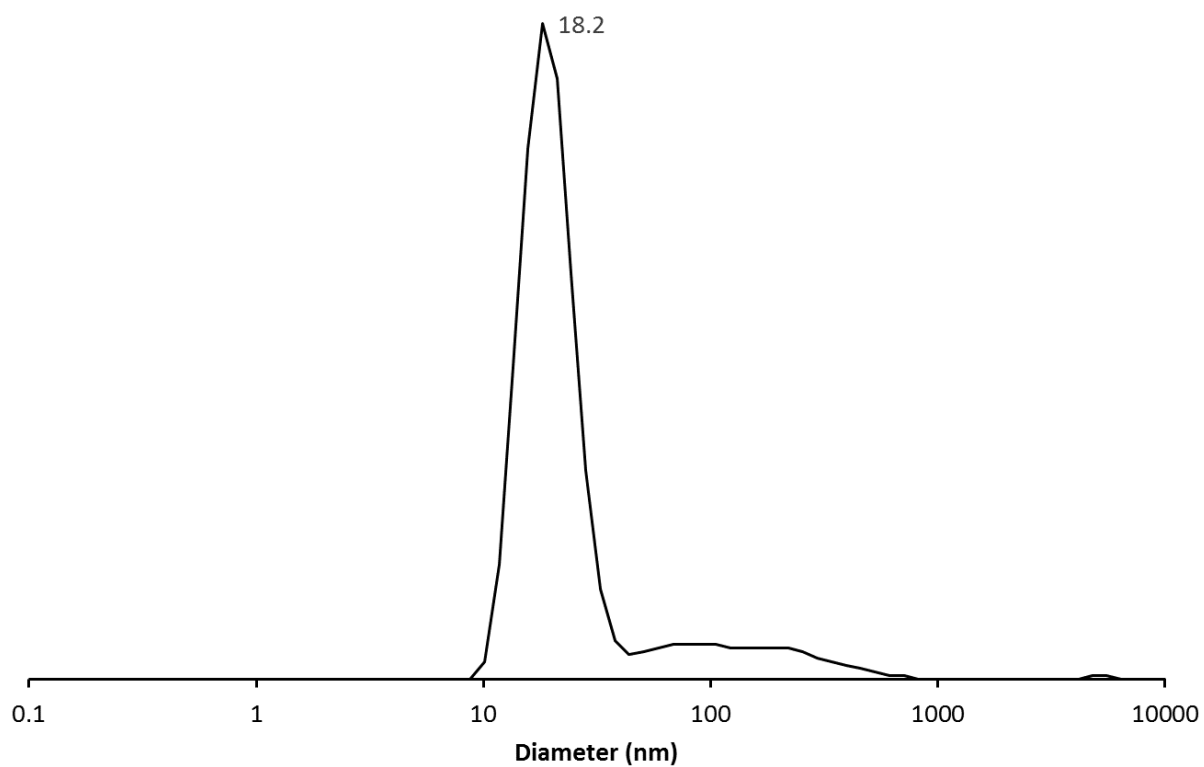


Figure S13. DLS size distribution by volume of [PCE][Cl]_n complex (H₂O, 25 °C, 2 mg mL⁻¹). $R_h = 18.2$ nm.

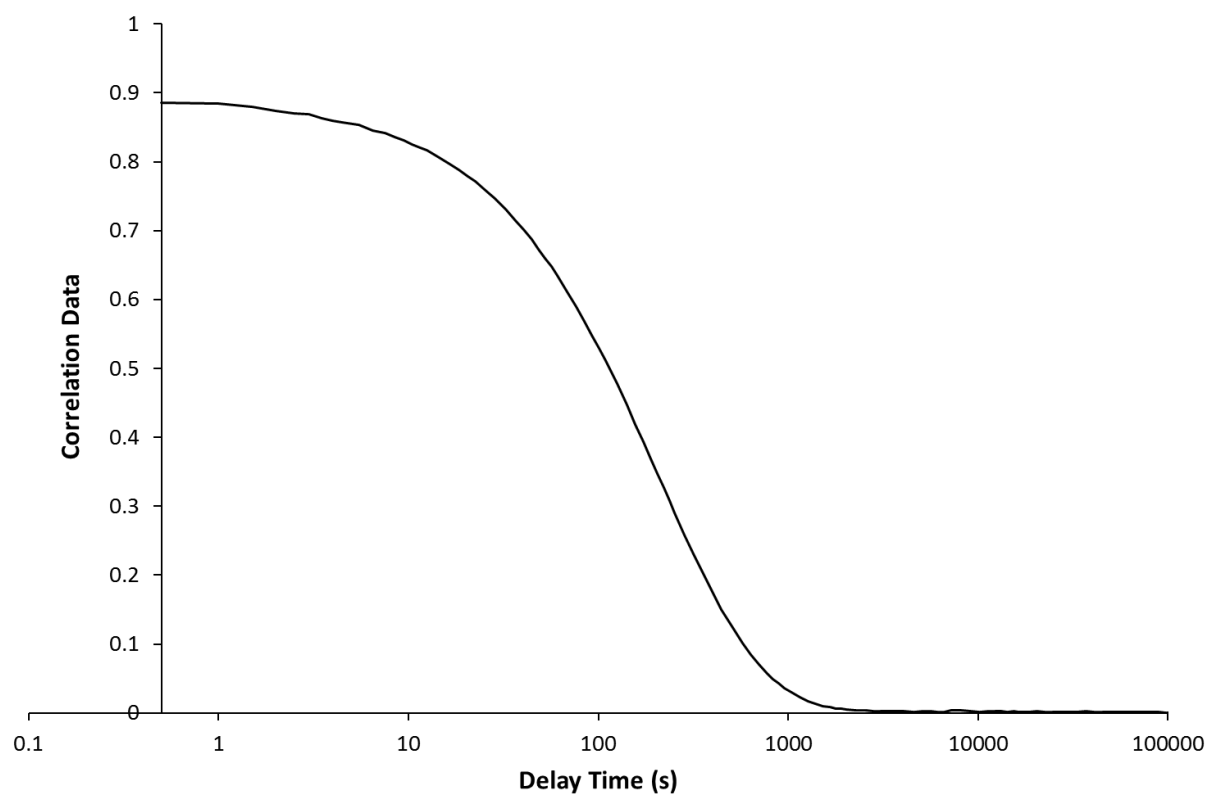


Figure S14. Raw DLS correlation data of [PCE][Cl]_n complex (H₂O, 25 °C, 2 mg mL⁻¹).

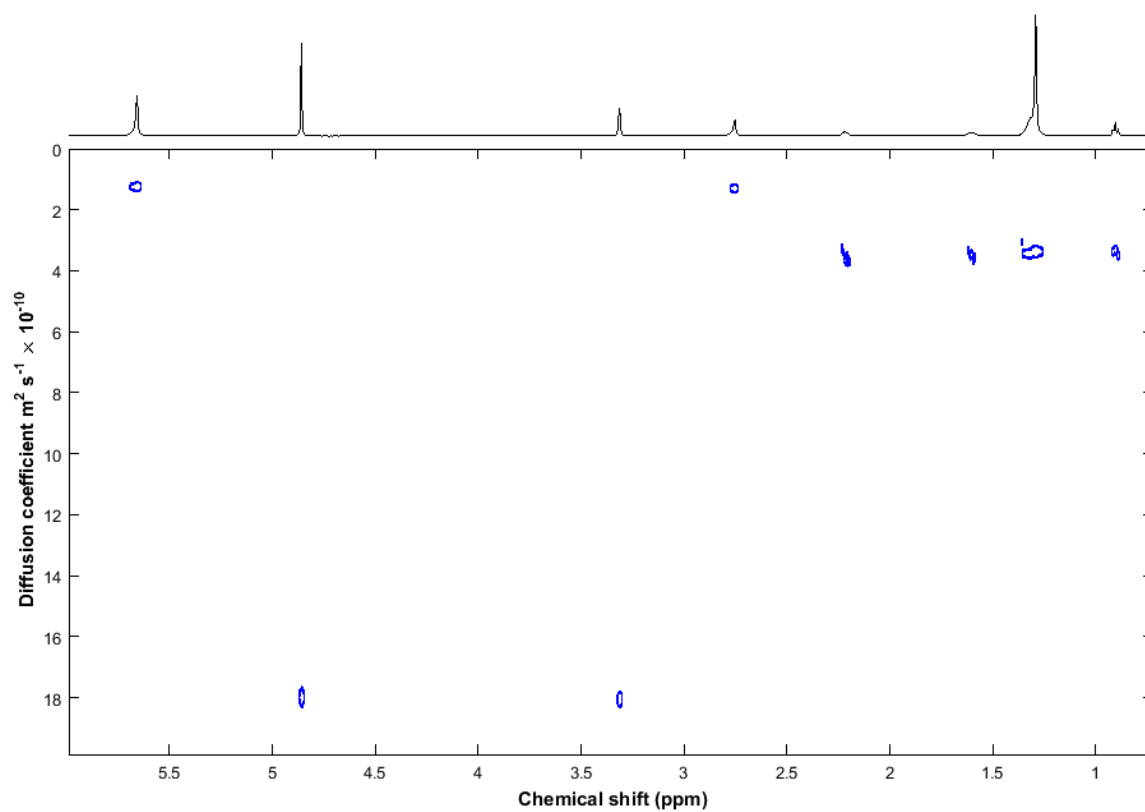


Figure S15. ¹H DOSY NMR (500 MHz, CD₃OD) spectrum of [PCE][C₁₆-L-Ala]_n complex.

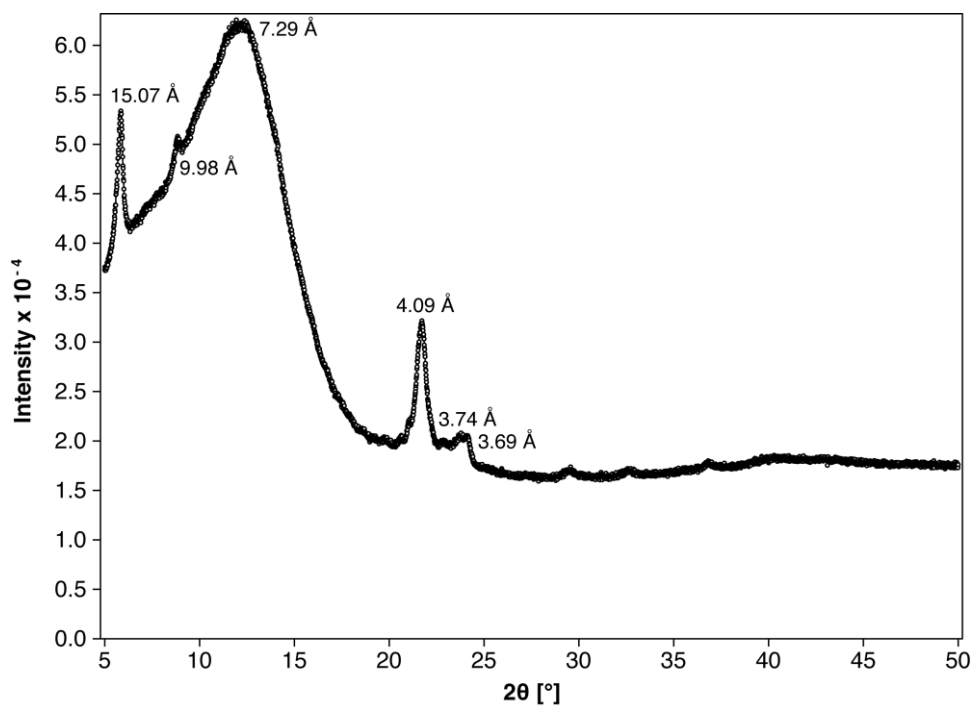


Figure S16. WAXS data for [PCE][C₁₆-L-Ala]_n drop cast from an ethanolic solution (12 mg mL⁻¹).

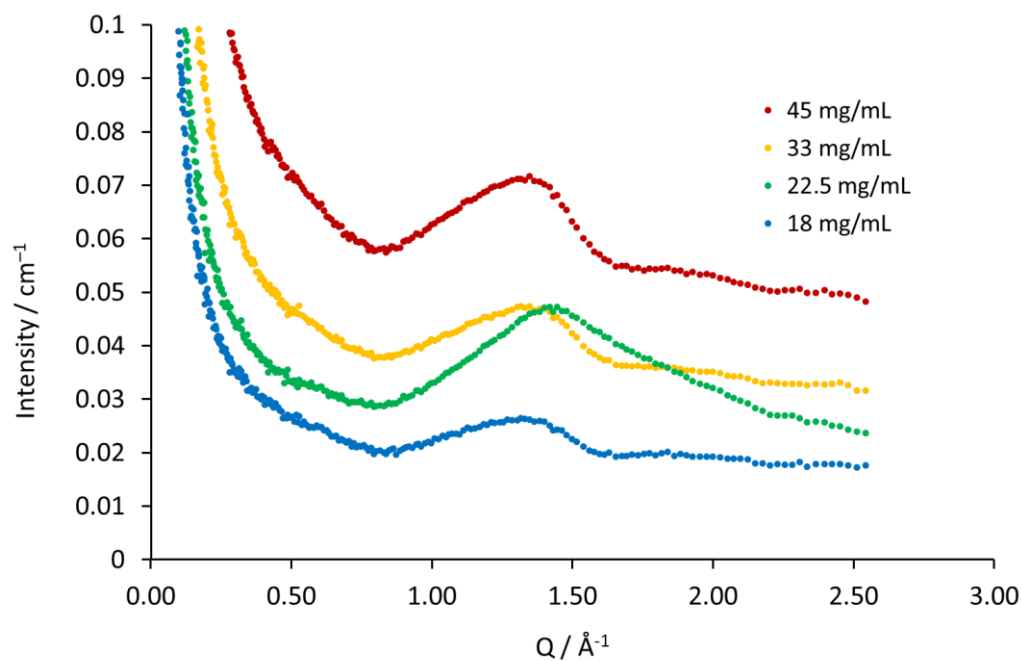


Figure S17. Small angle X-ray scattering data: plot of the scattered intensity (I) versus the magnitude of the scattering vector (Q) for [PCE][C₁₆-L-Ala]_n at various concentrations in ethanol.

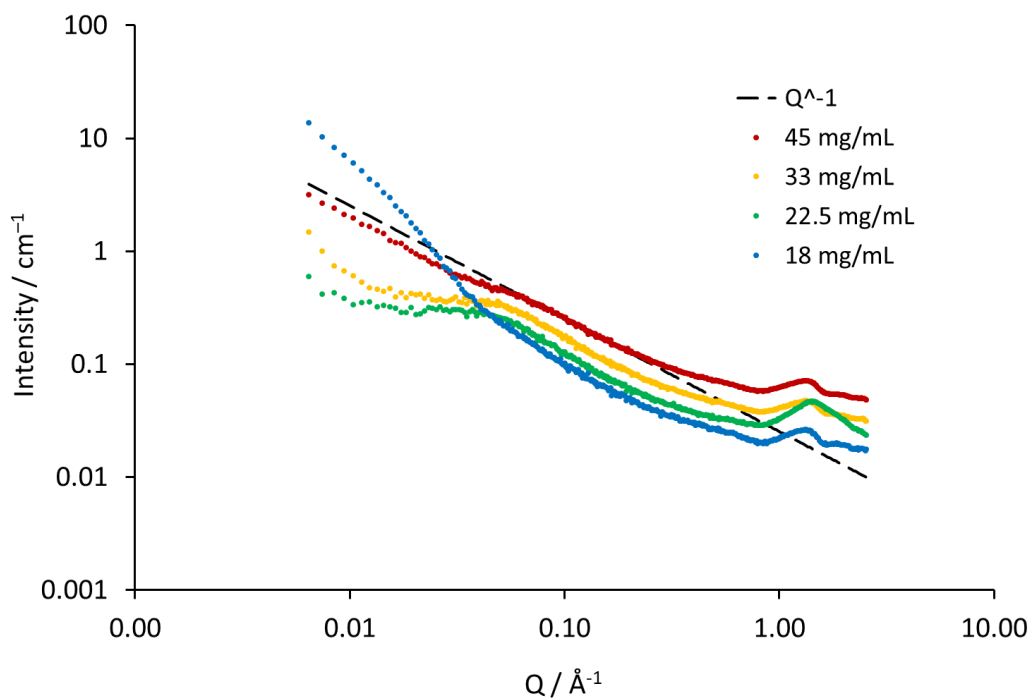


Figure S18. Small angle X-ray scattering data: log-log plot of the scattered intensity (I) versus the magnitude of the scattering vector (Q) for [PCE][C₁₆-L-Ala]_n at various concentrations in ethanol.

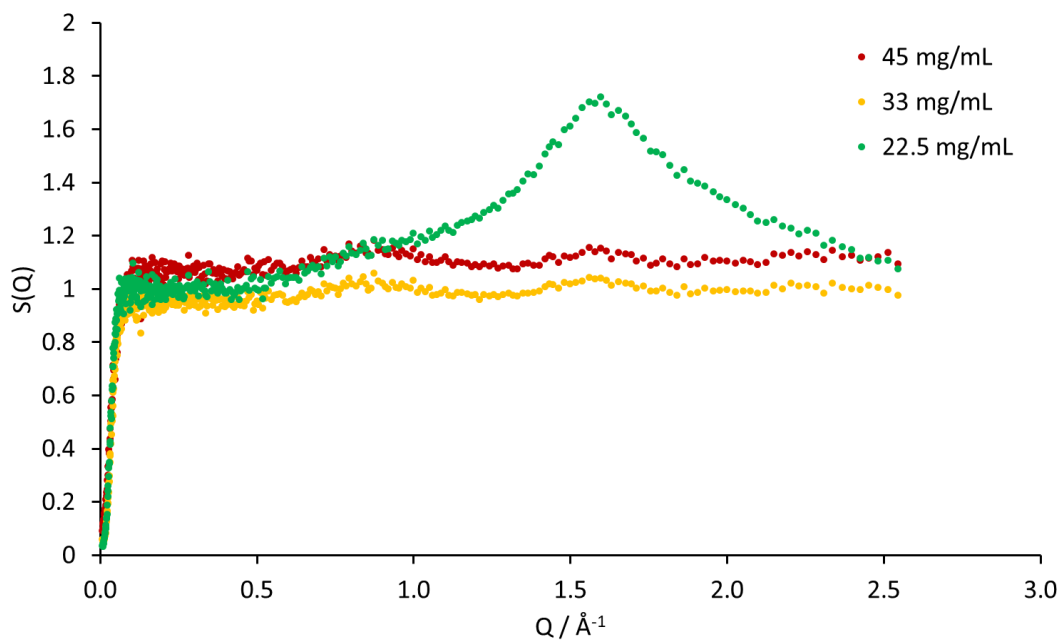


Figure S19. Small angle X-ray scattering data: plot of the product of the scattering factor $S(Q)$ versus the magnitude of the scattering vector (Q) for [PCE][C₁₆-L-Ala]_n at various concentrations in ethanol.

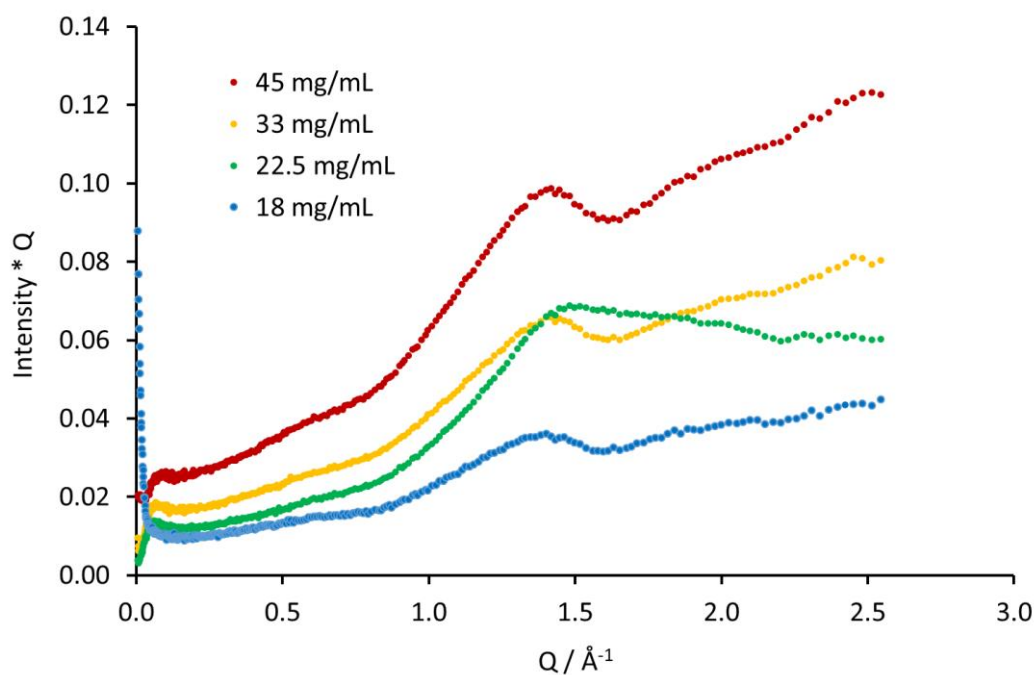


Figure S20. Small angle X-ray scattering data: plot of the product of the scattered intensity and the scattering vector ($I*Q$) versus the magnitude of the scattering vector (Q) for [PCE][C₁₆-L-Ala]_n at various concentrations in ethanol.

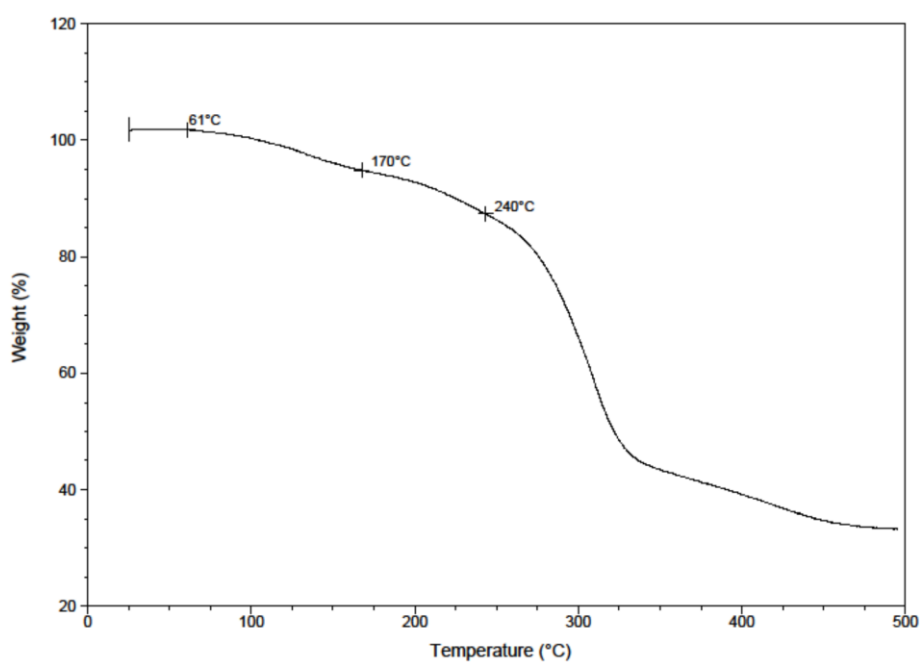


Figure S21. TGA thermogram for [PCE][C₁₆-L-Ala]_n drop cast from an ethanolic solution (12 mg mL⁻¹).

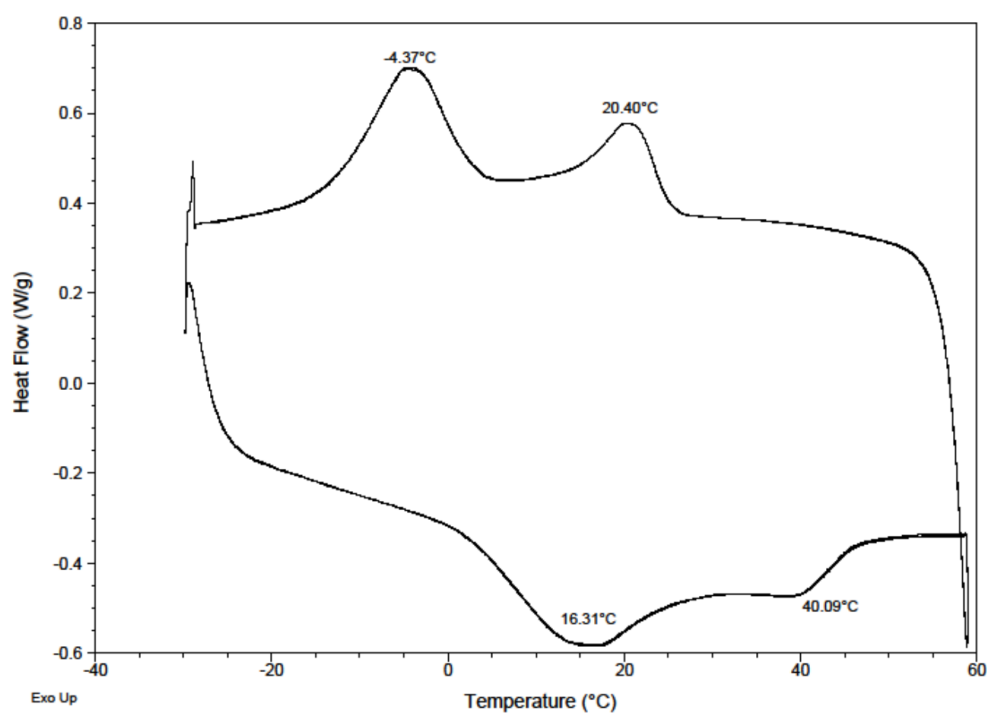


Figure S22. DSC thermogram for [PCE][C₁₆-L-Ala]_n drop cast from an ethanolic solution (12 mg mL⁻¹) obtained at a scan rate of 10 °C min⁻¹.

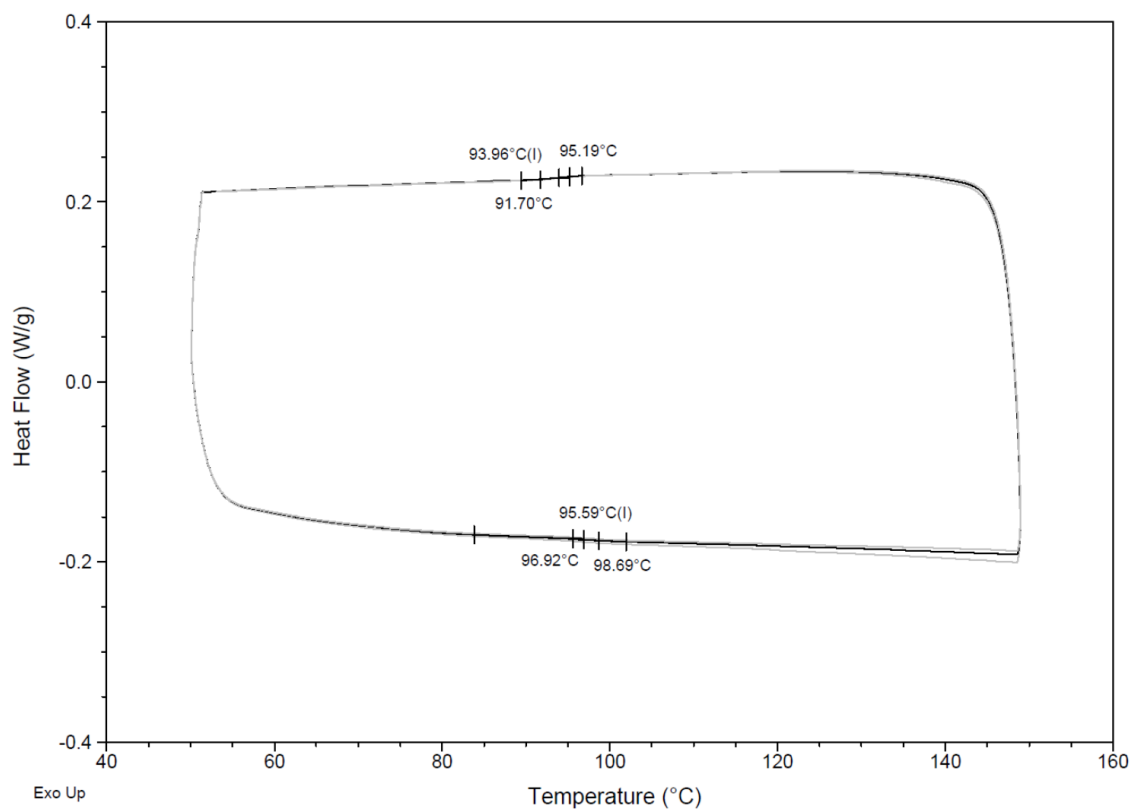


Figure S23. DSC thermogram for [PCE][Cl]_n solid obtained at a scan rate of 10 °C min⁻¹.

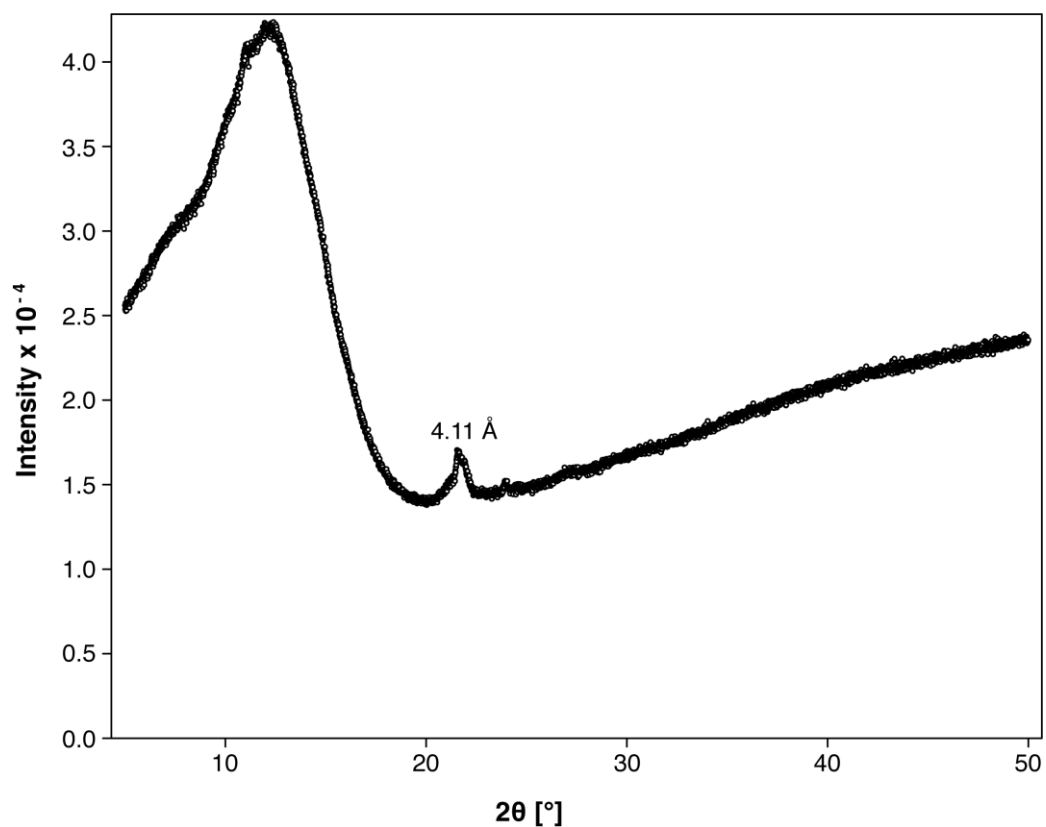


Figure S24. WAXS data for [PCE][Cl]_n solid.

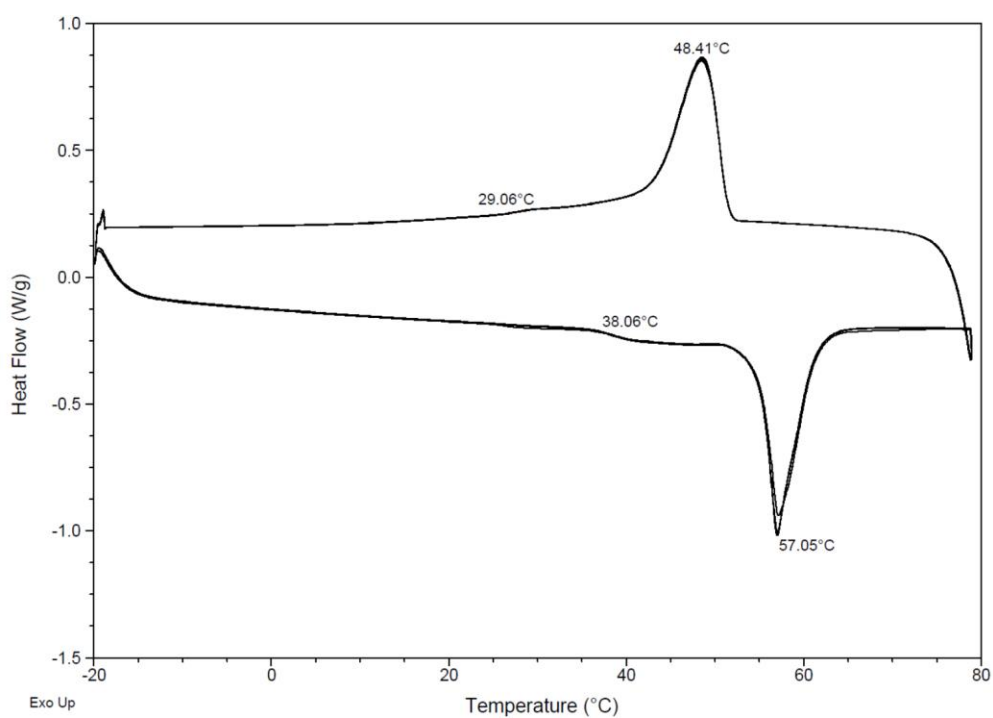


Figure S25. DSC thermogram for [Na][C₁₆-L-Ala] (drop cast from a concentrated ethanol solution) obtained at a scan rate of 10 °C min⁻¹.

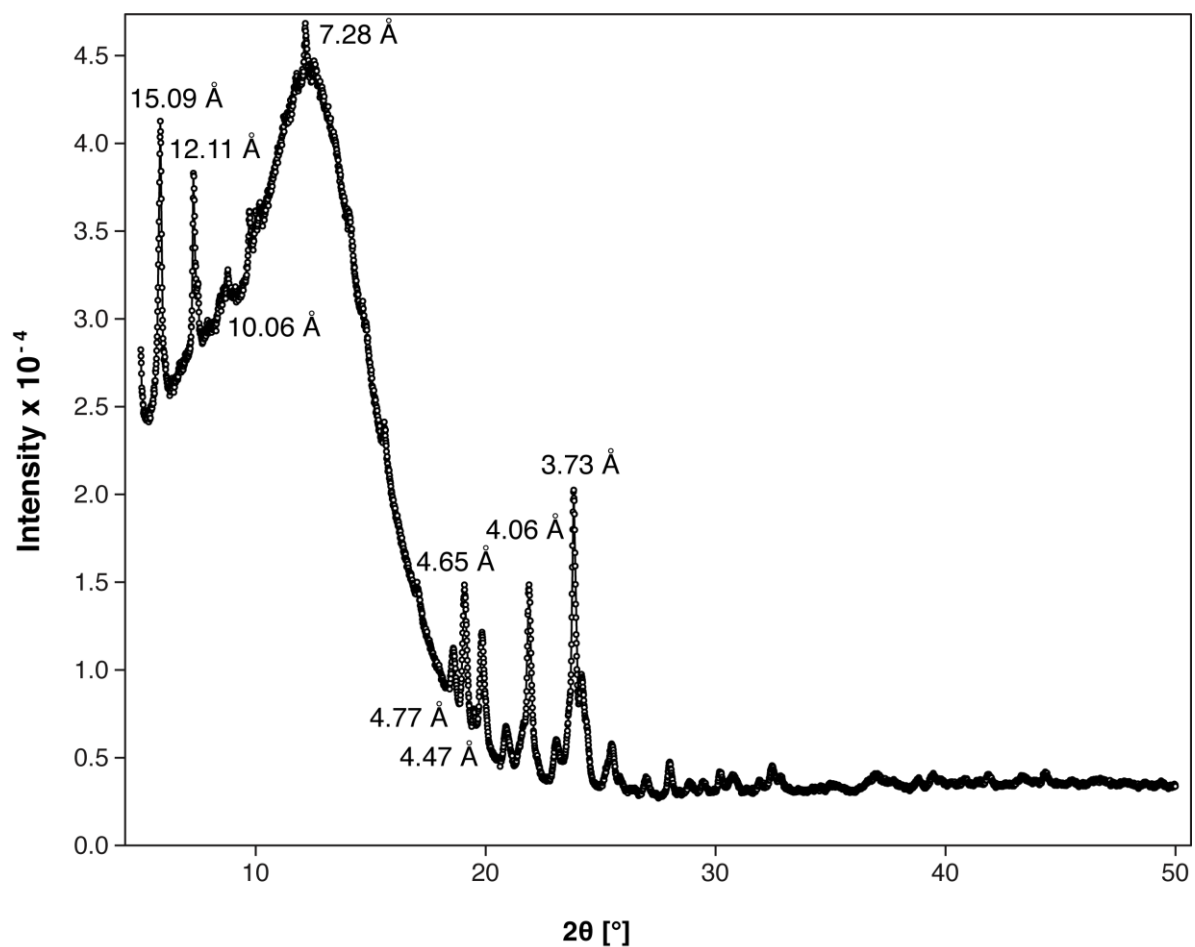


Figure S26. WAXS data for $[\text{Na}][\text{C}_{16}\text{-L-Ala}]$ (drop cast from a concentrated ethanol solution)

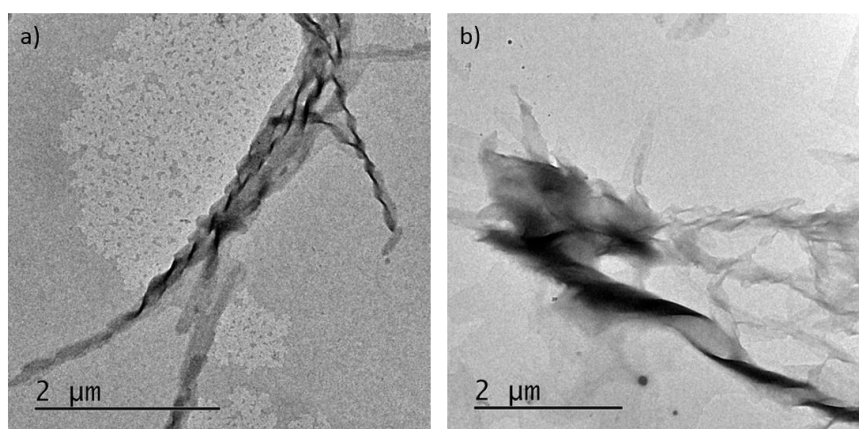


Figure S27. Additional representative TEM images of assemblies of $[\text{PCE}][\text{C}_{16}\text{-L-Ala}]_n$ in water on a carbon-coated copper grid, showing a) tightly twisted helices, and b) a larger twisted coil.

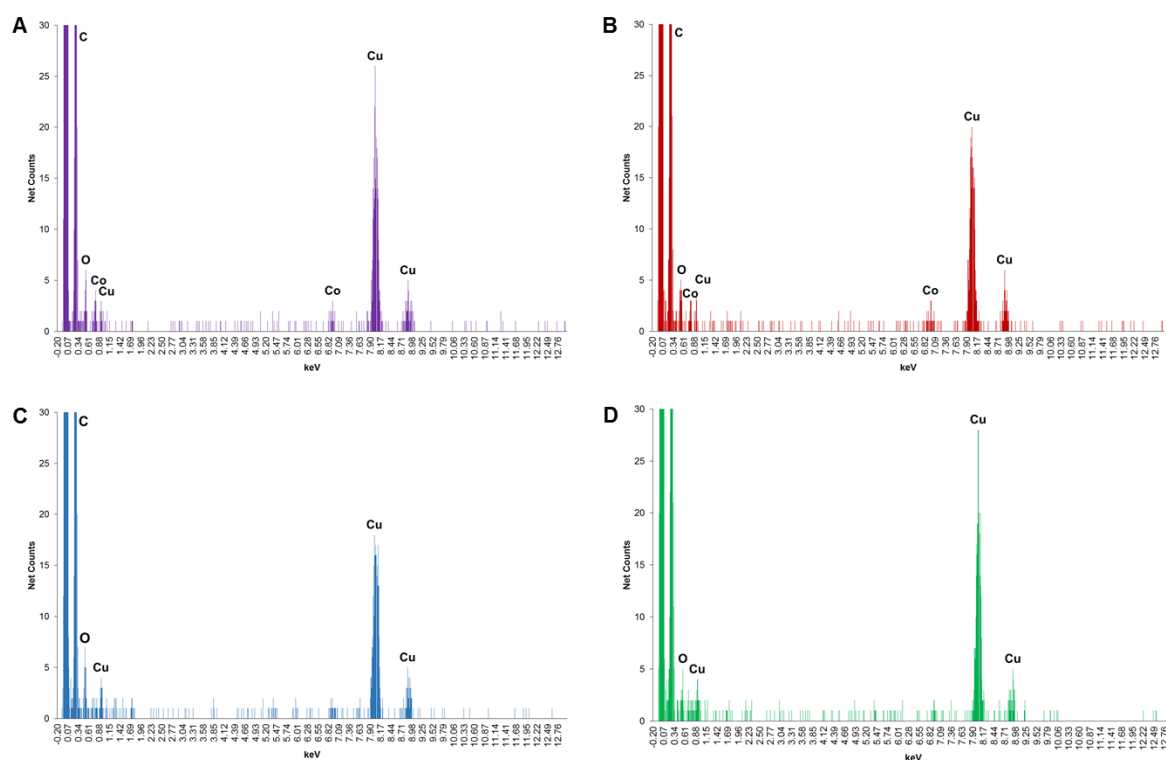
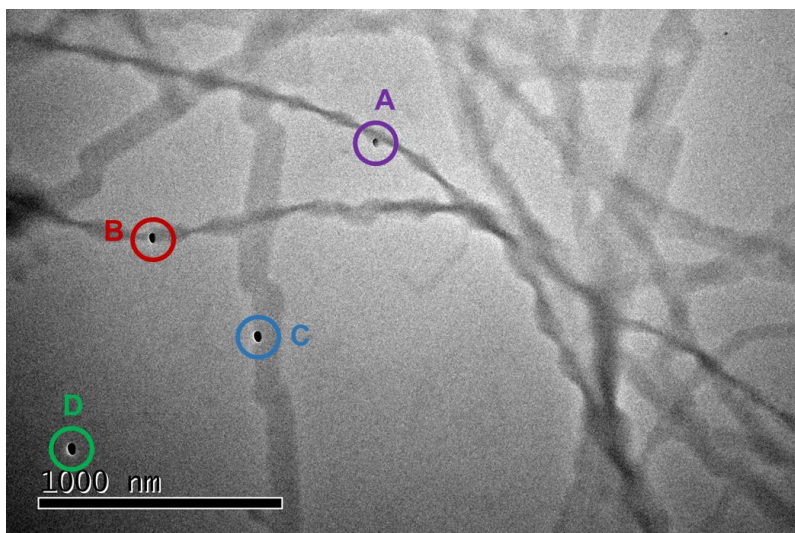


Figure S28. EDX analyses of spots A, B, C and D of [PCE][C₁₆-L-Ala]_n suspension in water, drop cast onto a carbon-coated copper TEM grid. The detection of Cu in all cases is due to the use of copper TEM grids.

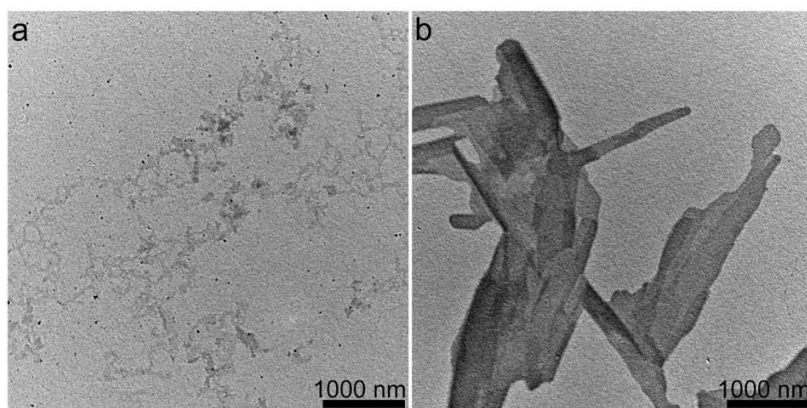


Figure S29. TEM images obtained by drop-casting an aliquot of solutions of (a) $[\text{PCE}][\text{NO}_3]_n$ in water and (b) $[\text{Na}][\text{C}_{16}\text{-L-Ala}]$ in a mixture of water and ethanol (1:1 in volume ratio) drop cast onto carbon-coated copper grids.

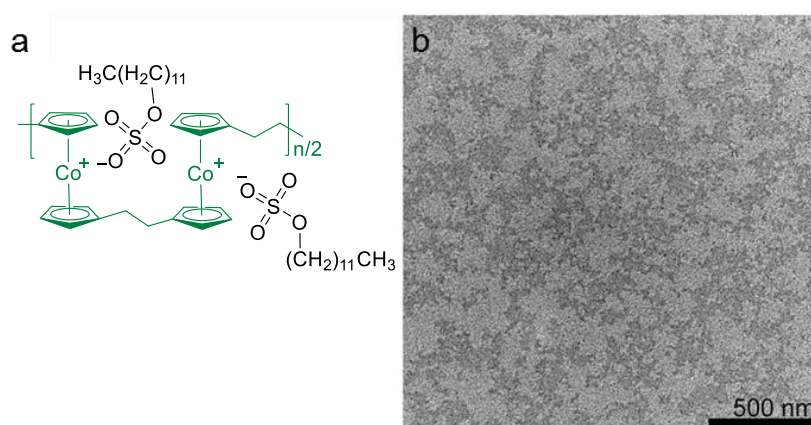


Figure S30. a) Molecular structure of $[\text{PCE}][\text{SDS}]_n$ and b) TEM image obtained by drop-casting an aliquot of solution of $[\text{PCE}][\text{SDS}]_n$ complex in ethanol on a carbon-coated copper grid.

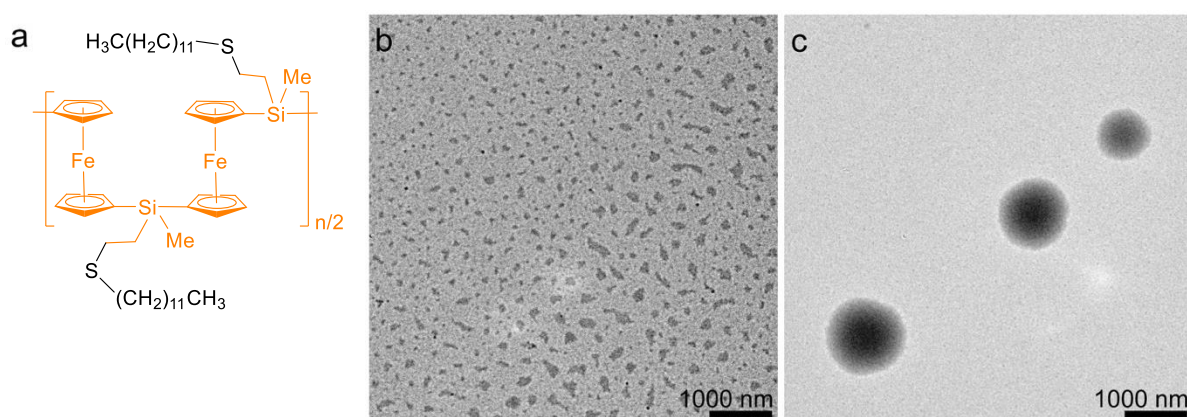


Figure S31. a) Molecular structure of PFS-C_{12} and TEM images obtained by drop-casting an aliquot of solutions of PFS-C_{12} in b) hexane and c) isopropanol on a carbon-coated copper grid.

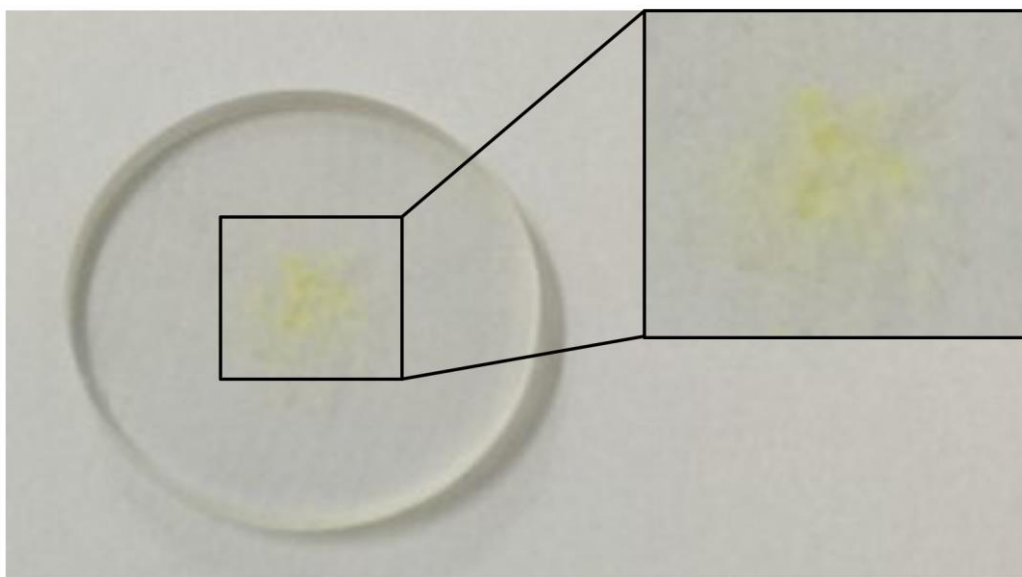


Figure S32. Photograph of yellow [PCE][C₁₆-L-Ala]_n precipitate of helical assemblies (isolated after dialysis with water) pressed between two quartz plates during sample preparation for solid-state CD measurements.

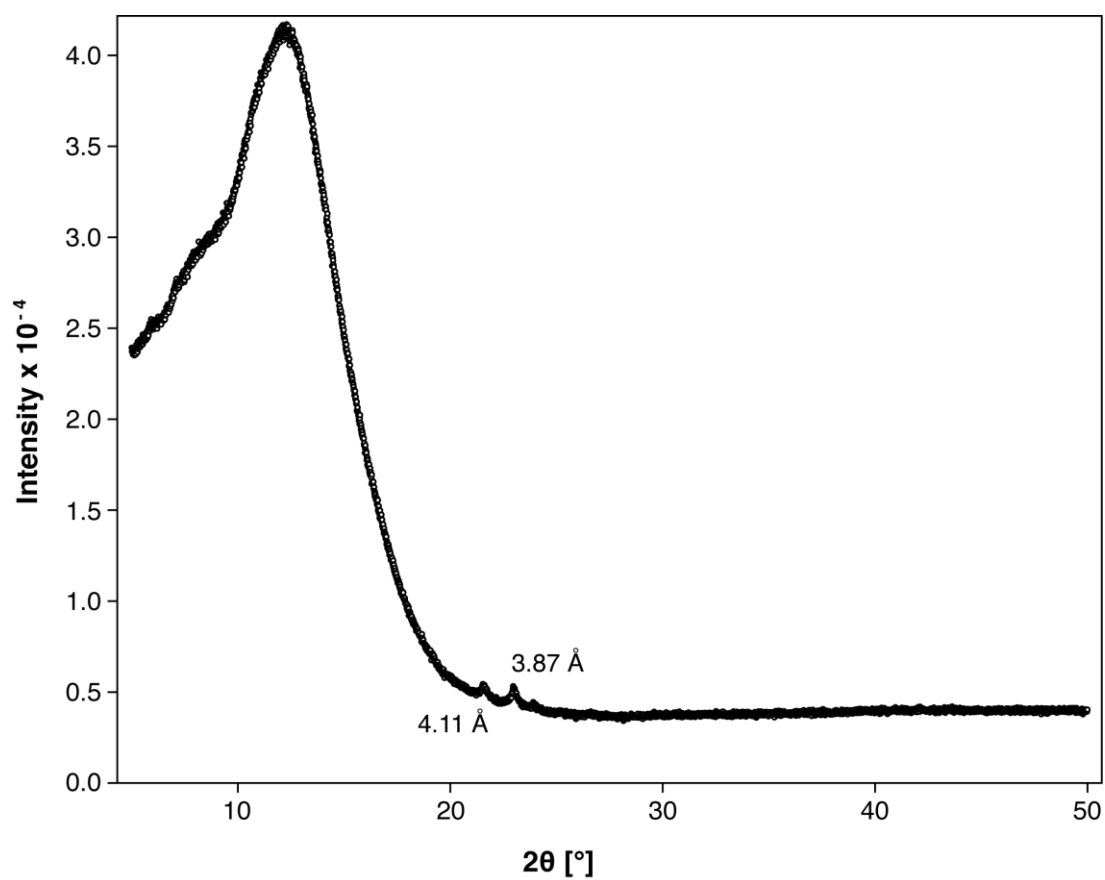


Figure S33. WAXS data for helical assemblies of [PCE][C₁₆-L-Ala]_n from water.

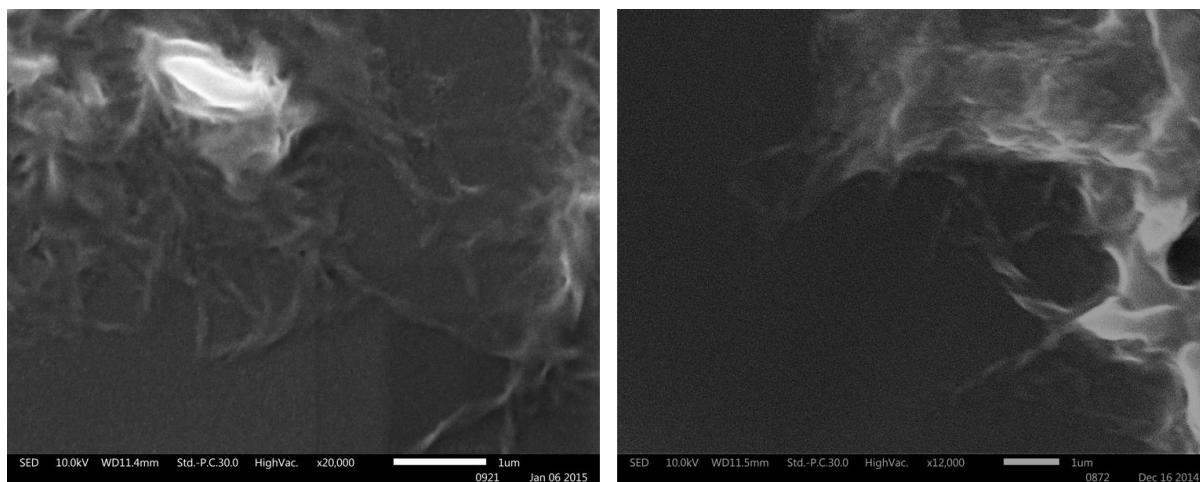


Figure S34. Additional representative SEM images of helical assemblies of [PCE][C₁₆-L-Ala]_n in water onto a carbon-coated copper grid which has been sputter-coated with Pt/Pd alloy.

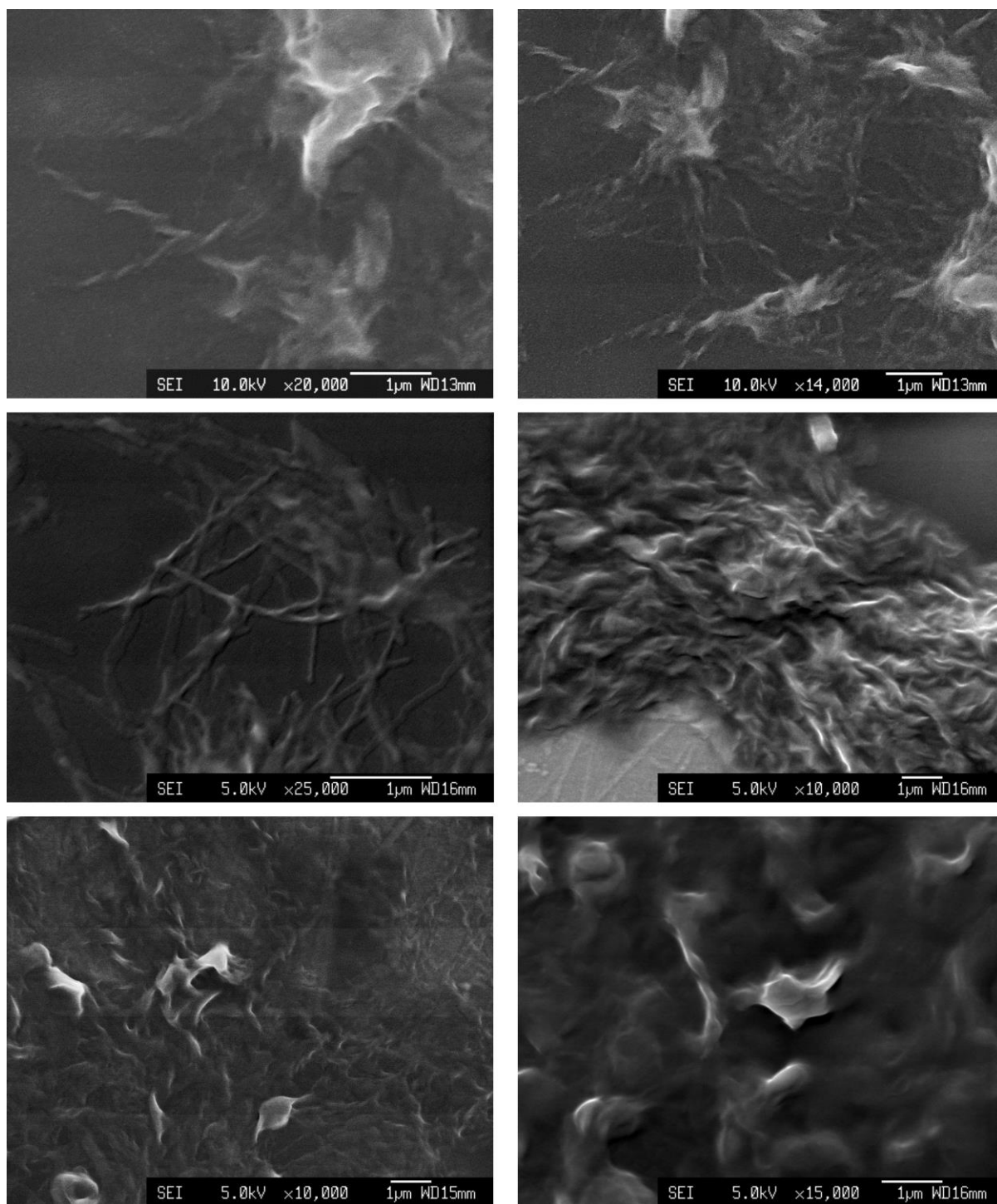


Figure S35. Additional representative field emission SEM (FE-SEM) images of assemblies of [PCE][C₁₆-L-Ala]_n in water on a carbon-coated copper grid with subsequent sputter-coating with Pt/Pd alloy.

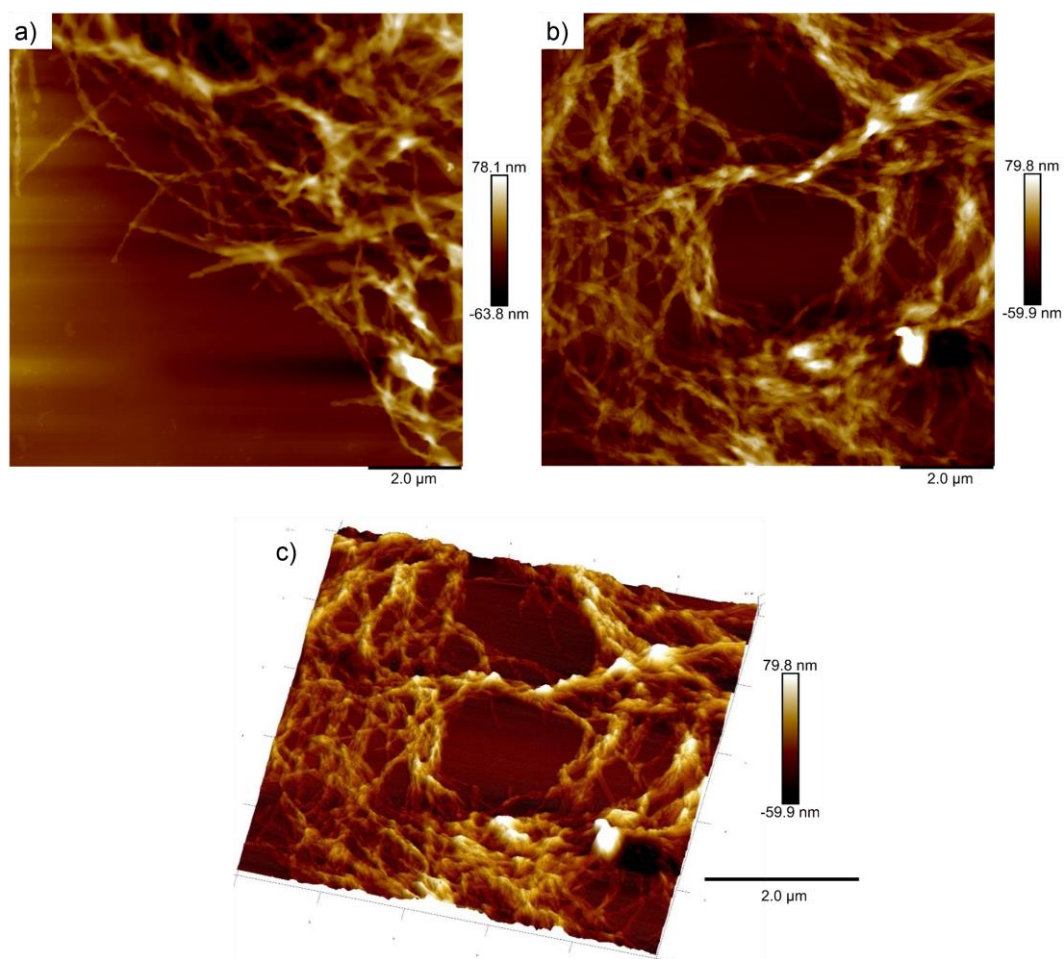


Figure S36. Additional AFM images obtained by drop-casting an aliquot of suspensions of [PCE][C₁₆-L-Ala]_n in water onto a carbon-coated copper TEM grid

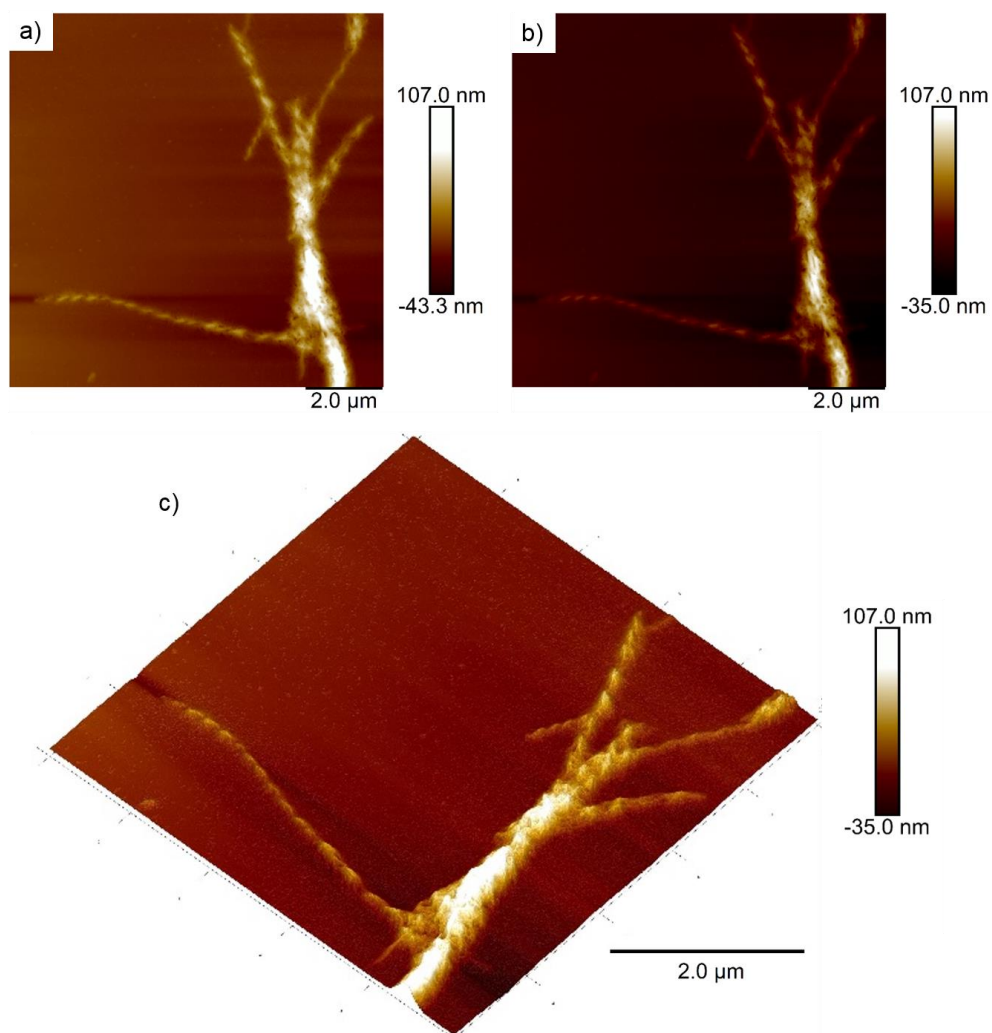


Figure S37. Additional AFM images obtained by drop-casting an aliquot of suspensions of [PCE][C₁₆-L-Ala]_n in water onto a freshly cleaved mica surface.